

The bands at 420-430 and 440-450 MHz are presently shared with the Amateur Radio Service. For reasons of international coordination the Amateur Service does not use the 420-430 MHz band near the Canadian border, and in those areas it has been available to PMRS. However, the 420-430 MHz band is well used in the rest of the country, and incompatibilities may be expected between the point-to-point links, Am television systems, and data systems now operated by Amateurs in that area, and conventional telephony or other uses to which PMRS would put such spectrum. Use of 440-450 MHz by Amateurs is secondary to Government use, and this has worked satisfactorily for both parties, with Amateur use restricted around specific sites. A deployed radar system has operated for years on 440 MHz, and has proven effective in detecting and tracking missiles. While the number of anti-missile radar sites is limited by treaty, they are not now less important to our security than before. Many more airborne and sea-born military radiolocation installations operate in these bands, and would be displaced by Petitioner's request, constituting a major drain on the Defense budget, and a imposing major deficiencies in our nation's defensive capabilities.

"A. Recommendation Comments

"These recommendations are based on the LMCC's best assessment of the threshold characteristics of spectrum appropriate for allocation to the PMRS industry. First, this analysis was limited to the bands below 2 GHz. Because of the substantial increase in propagation loss, reduced maximum safe transmitter power levels, and increased difficulty in creating small, low cost products, spectrum at higher frequencies is generally unusable for PMRS use. Second, bands of spectrum that are reasonably close to existing PMRS allocations are preferred. An allocation of spectrum located too far from bands where existing equipment operates would require a lengthy and more costly equipment development process to be completed before such spectrum could be put to use. Last, the LMCC selected bands of Federal Government spectrum that were likely to become available as a result of evolutionary changes in Federal usage, such as military down-sizing and technological shifts. Because partial continued use of such Federal Government spectrum may remain vital, the LMCC embraces the recommendations of the SPAC report and believes that shared spectrum use may be a viable alternative to outright reallocation in some cases. Accordingly, the bands discussed in detail below, are representative of this criteria. However, these are not the only bands that meet this criteria. Additional bands may be appropriate for allocation to the PMRS community."

It should be noted here that equipment now under development for the new 600MHz band will probably be available before exiting users of the spectrum Petitioner wishes to occupy can be relocated. Therefore, the argument that equipment development is of importance loses much of its force.

A curious remark in footnote 37, reproduced here, needs comment of its own:

"37

In important association, it is also recommended that an additional 70 MHz of this band be reallocated to PMRS public safety services, in order to satisfy their projected year 2010 needs. The remaining 100 MHz would be generally devoted to on-going aeronautical needs, such as perhaps air-to-ground data links, remaining use of collision avoidance systems (at 1030 and 1090 MHz) and possible GPS enhancements." (Underline added)

The IFF systems operating at 1030 and 1090 MHz are not merely collision avoidance systems, but are an integral and indeed indispensable part of the Air Traffic Control system world-wide. The manner in which their use is dismissed suggests that perhaps other aspects of LMCC's Petition may be as ill-founded.

"420-450 MHz

As previously noted, PMRS already uses 420-430 MHz in three Canadian border cities. History shows that a substantial number of PMRS systems have been implemented in these cities, with no interference problems, either with Canadian systems across the border or with Federal Government systems in the U.S."

Petitioner has failed to here note that such successful cross-border sharing took extraordinary coordination with Canadian users, restraint on the part of Government users, and prohibition of Amateur Service use of these frequencies North of a line extending from one side of the country to the other. If the effort needed to permit PMRS use in the few cities where it uses this range is considered, the repercussions of widespread use of this band for PMRS North of Line A argue against the Petition, at least in that geographical area.

"A reduction in military use of this band is foreseen and it could be that most PMRS services could co-exist in most significant geographical areas of the U.S., with perhaps PAVE PAWS (Precision Acquisition Vehicle Entry Phased Array Warning System) geographical restrictions in parts of California, Georgia, Massachusetts and Texas."

As this writer has pointed out, such a reduction, while foreseen, is by no means certain, and recent developments have made it even less certain. Furthermore, there is no need to expedite any action in this regard, considering the other alternatives available to those presently served by PMRS, as efficiencies achieved by intelligent re-engineering of existing systems can compensate for the unique requirements in the few places where PMRS users are experiencing problems.

"NOAA is experimenting with Wind Profiler use at 449 MHz. Ideally, this should be discouraged or at least minimized, in favor of higher frequency operation (e.g. 915 MHz), if reallocation to PMRS is considered. The band is generally popular with radio amateurs, currently on a secondary basis, with repeater use in 440-450 MHz and satellite links and amateur television in 430-440 MHz."

The 915 MHz ISSM band is well populated with other users already, most of them unprotected Part 15 users, but including Vehicle Locating systems, which must be protected, and Amateur Radio, secondary to Locators.

To say that the 440-450 MHz band is "generally popular with radio amateurs," is to grossly understate its use. In many cities, every available frequency has been coordinated for repeater operation. Where it uses the same technologies, the Amateur Service often suffers the same problems as PMRS, but Amateurs, at least, have made frequency sharing work by allowing use of unoccupied frequencies and repeaters, something that should be considered as an alternative to expansion by PMRS users.

Amateur use of 430-440 MHz is also understated. Because of the nature of the Amateur Service, it is not possible to pin down usage by reference to frequency lists. However, a great deal of experimentation is carried out in this area which will be made much more difficult to carry out if it is withdrawn or shared with PMRS. This is also the prime allocation for Amateur Radio weak signal operation and experimentation, and is one of the UHF bands where international operation is not only possible, but common, being carried out not only via Amateur Radio satellites, but also by Earth-Moon-Earth communications. This could not coexist with or near a large base of PMRS operations, and neither could the terrestrial weak-signal operations conducted in this range.

"Because of its closeness to the 450-512 MHz "work-horse" band, existing equipment may be employed for the use of this spectrum. A key reason for pairing the two sub-bands, with a 20 MHz spacing, is to provide for efficient duplex/repeater operations on the fixed ends of systems. If 430-440 MHz were reallocated instead, the spacing would be reduced to 5 MHz, which, though workable (450-470 operations use 5 MHz spacings), increases the difficulties, costs and resultant potential interference problems."

Full-duplex operation for PMRS is speculative, and unsupported by a need.

"It is recognized that these sub-bands are used on a secondary basis by the radio amateur community, as is 430-440 MHz. However, the LMCC believes that the 430-440 MHz sub-band is more important to the amateurs for use in emerging technologies such as links with spacecraft and amateur television applications. Amateur applications in the 420-430/440-450 MHz should remain secondary to PMRS. Furthermore, to the extent that new PMRS advanced services are implemented here, equipment availability and technology would benefit amateurs pursuing such applications as compressed video television in the 430-440 MHz band. Though the most urgent need for PMRS is the more traditional voice and low speed data applications, ultimate band structuring might include a portion dedicated to these advanced services. " (Underline added)

For reasons explained already, sharing between the Amateur Service and PMRS is unlikely to be as successful as sharing between the Government Radio Service and the Amateur Radio Service. Moreover, the structure of PMRS is not suitable for experimentation, and Amateur use of such a shared band would not be conducive to innovation, which is one of the Amateur Service's charters.

"ii. 1 390-1400/1427-1432/1670-1675 MHz

This net 20 MHz of spectrum is targeted for transfer from the Federal to the non-government sector in 1999. However, restrictions on use will remain for some time. Federal operations in the 1390-1400 MHz band will receive protection at 17 sites for 14 years; 1427-1432 MHz will be protected at 14 sites for 9 years; 1670-1675 MHz will be protected at two sites (Wallops Island, VA, and Fairbanks, AK) forever. Many of these protected sites are in key urban areas such as the east coast and would substantially limit any potential PMRS deployments in those areas. Though this band is not heavily encumbered, it does have significant shortcomings that prevent its immediate reallocation for PMRS users. First there is the issue of restricted availability in many major metropolitan areas. In some cases the restriction may be based more on interference-to-PMRS than the reverse. This may, for instance, be the case for 1390-1400 MHz, where the primary government installations are radar systems. It may be possible to negotiate somewhat smaller restriction areas than are now defined, or otherwise establish PMRS/Federal coordination processes that attempt to minimize these impacts. It may also be possible for prospective PMRS licensees to utilize more advanced technologies to mitigate interference received from government installations during this mid-term transition period. In addition, this band is inherently more costly to implement PMRS systems in, as compared to 450-900 MHz, due to its significantly higher frequency. It has been previously demonstrated that a cost increase of approximately 17:1 would be incurred at 2.3 GHz and, though not currently calculated, system costs for implementation in this band could easily be increased by 4-10 times. Future PCS technology developments in the 1850-1990 MHz band will have some degree of benefit here to reduce costs, but most PMRS systems will not be able to take advantage of very small cell approaches such as will be implemented in PCS, thereby minimizing technology spill-over advantages. Finally, there is currently no PMRS equipment available in this band. Manufacturers will, in most cases, be required to develop entirely new equipment to serve this band. Further, it is not clear what the best structuring of the three sub-bands might be. For instance, splitting 1390-1400 MHz into two paired segments results in an almost impossibly tight 0.36% spacing. The 1390-1400 MHz band will have to be paired with 1427-1432 MHz (2.4% spacing) for half the need, and with 1670-1675 MHz (9% spacing) for the other half. This additional complexity will further negatively impact manufacturer's ability to respond to potential licensee needs.

On a closing note for this band, two additional possibilities present themselves. First, the Federal Government, in negotiation with PMRS representatives, might find that some additional nearby spectrum, not currently identified, might be transferred in order to expand the potential utility of this band. Such transfer might, if necessary, envision shared PMRS and Federal use, with associated restrictions but also associated benefits to both parties. It is recommended that such discussions ensue. Also, recognizing that amateur radio service will see a net constriction by the recommended reallocation of 420-430/440-450 MHz, some of this spectrum might be reallocated to amateur service to offset the constriction. This would of course reduce the amount of spectrum reallocated to PMRS but might be of value to speed up net availability of the lower band. For example, 1390-1395/1427-1432 MHz might be allocated to amateur service with 1395-1400/1670-1675 MHz going to PMRS. " (Underline added)

While it would be ungracious not to recognize an olive branch when one is extended, the Amateur Radio allocation at 1240-1300 MHz is already being examined for other uses, and to suggest that there exists spectrum in this area which is available to Amateur use, turns a blind eye to spectrum pressure in this range. Petitioner surely cannot have crafted its proposal in a vacuum, yet it seems not to recognize that others besides itself, and other nations as well, have spectrum demands which must be resolved.

960-1215 MHz 79. The 960-1215 MHz band is allocated to Federal Government aeronautical radio navigation services (Tactical Air Navigation ("TACAN") and Distance Measuring Equipment ("DME")), and is used by both commercial and military aircraft. This large amount of spectrum is structured into 1 MHz channels, with pulse ranging used for determining distance from aircraft to transponders. Aircraft interrogate transponders by transmitting pulse pairs at a given frequency. Ground transponders then respond with similar pulses on a different frequency. Aircraft determine range by measuring the time delay between interrogation and response. This overall concept is prone to many sources of error and requires care in assigning frequencies to various ground transponders to minimize co-channel and adjacent channel interferences. This distance measuring system has been in place for decades and, when initiated, did not envision the technological advances in Global Navigation Satellite Systems ("GNSS"), as represented today by the global positioning satellites ("GPS"). As a result, the initial planning for the transition from this system to GPS has already begun, as evidenced by the following quotes from the study "Aeronautical Spectrum Planning for 1997-2010":

Section 3.2.7: Aviation navigation is currently migrating from ground-based navigation systems to satellite-based navigation systems Section 3.2.7.1: GPS is used extensively worldwide by the DOD and the civilian community and it will be the primary radio navigation system for the DOD, the civil community and others well into the next century

It is clear that there is and will continue to be a strong, worldwide movement away from TACAN/DME system use and to GNSS for all navigation purposes, including en route, initial approach and even final approach requirements. It is also noted that the DOD has developed an integrated communications, navigation and identification ("ICNI") capability using spread spectrum technology in the 960-1215 MHz band, known as JTIDS/MIDS, which is being integrated into US military and NATO platforms. This new service is currently implemented on a non-interference to TACAN/DME basis, with coordination by FAA and NTIA and, being spread spectrum, is inherently compatible with the existing services. Consequently, nearly all of this large band that is currently assigned to TACAN/MDE should become available over the next 10 years."

Petitioner's confidence that spectrum will be vacated rests on present actions, yet those actions are also subject to change. The reliability of the GPS system as yet to be established through a high solar maximum, and experience with commercial satellite operations, particularly the recent Galaxy 4 mishap, has not provided confidence that the GNCC system will prove reliable enough for safety of flight as the solar flux increases and as solar events become more common.

And as TACAN/DME is phased out, others beside PMRS are seeking spectrum. Petitioner has not made a strong case for occupation of lower frequencies, which are not being eyed by competing users, and the case for these must also stand up under competing demands.

"It is recognized that the aeronautical navigation services in this band are of considerable importance. On the other hand, it is clear that these services will shift to the new GNSS operations in the not-too-distant future and that this spectrum offers the last chance for PMRS to access spectrum that is both sufficient in scope and low enough in frequency to satisfy foreseeable future needs, including the perceived explosion in demand for advanced, wide bandwidth applications. Based upon a year 2010 non-public safety PMRS total need of 125 MHz, and assuming 35-44 MHz of that need is satisfied via other near to mid-term allocations, 85 MHz of additional spectrum should be reallocated from this band by 2010. In addition, it is recommended that another 70 MHz be reallocated to the public safety PMRS to satisfy their PSWAC report 2010 needs.

Petitioner is altogether too dismissive of the need for frequencies in this area. As earlier, in Footnote 37, where LMCC mistakes IFF for simply a collision avoidance system, Petitioner has failed to consider wider demands on the spectrum except as they affect its own and present spectrum occupants. This defect weakens its case.

"Over and above the quantitative considerations, this places both non-public safety and public safety services in the same band, where economies of scale and other technology leveraging can occur to the mutual benefit of both. Part of the 85 MHz reallocation would obviously be used to satisfy the existing substantial shortage of spectrum for airline terrestrial land mobile applications in and around airports. These terrestrial airport applications would also benefit greatly from the wide bandwidth advanced services that would be enabled and brought to market in this band, including imaging and real time video transmissions used in the complex logistics of today's airlines and airports. Since it is known that the DOD is investing considerable sums of money to develop their JTIDS/MIDS communications system to operate in this same band, discussions should be held between PMRS and NTIA to determine the best going-forward plan that allows optimization of both reallocation objectives for 2010. This might even include coordinated efforts at system and product design, such as to benefit the DOD through commercial technology leverage, while at the same time benefiting the PMRS from military technology advancements such as spread-spectrum, or over-the-air reprogrammable equipment."

LMCC here mentions for the first time a broadband use -- real-time video -- which its members might use. However, it is a use most of its members would not require, and could be dealt with as required, on a site-by site basis. Or, if LMCC avails itself of digital technology, it could be incorporated into digital data streams with little change to systems supporting other uses. Moreover, here, late in the Petition, LMCC finally mentions spread-spectrum technology, a technology which, if applied to its current operations, would resolve many problems its members experience.

30. LMCC proposes that, having gained a vast expanse of new spectrum, FCC oversight of its use be relaxed. This writer disagrees.

"VI. Spectrum Management

A. Sharing of Federal Government Spectrum

In keeping with the directive of the [sic] 1997 Budget Act Conference Report, the SPAC Report, and the findings of this petition, the FCC and the NTIA should promote the sharing of government spectrum with PMRS licensees by establishing engineering criteria and a streamlined administrative process for the sharing of government spectrum by PMRS users."

This writer cannot agree that sharing between the PMRS and the Government Services would be as successful as Petitioner speculates it would be. Many Government services are already converted to trunked systems, and Petitioner has already stated that such, in the form of CMRS, are not suitable to its needs. This writer believes trunking is not merely suitable, but for most PMRS licensees, preferable, but Petitioner's own argument collides here with its own proposal.

"The SPAC report of the NTIA notes that Federal agencies face risks of interference problems, as well as hundreds of millions of dollars in costs, from future transfers of government spectrum allocations to the PMRS sector. Efforts to require the deployment of spectrally efficient radio systems and to reallocate Federal spectrum for PMRS sector use will cost more than \$460 million. The report notes that permitting PMRS systems and Federal telecommunications services to share frequency bands could ease these problems. Because of an "ingrained symmetry" between these types of entities, it is likely that the PMRS and Federal Government users would be able to work out mutually compatible methods and rules of sharing. Interference problems and relocation costs would therefore be minimized."

Sharing would, if the Petition were granted, certainly allow a more graceful phase-in of new services and phase-out of Federal use. However, existing users, Radiolocation and the Amateur Service in particular, are not compatible with PMRS's operational modus.

"In order to avoid unnecessary bureaucracy and to permit the development of service rules in a timely manner, LMCC urges the FCC to establish streamlined licensing rules for the sharing of Federal spectrum. LMCC recognizes that it will need to work closely with NTIA to identify spectrum bands and establish interference criteria. However, the FCC must take action to ensure that spectrum identified for sharing is expeditiously made available for licensing, and applications are processed in a timely manner"

Because of the complexity of sharing issues, rules should not be relaxed for shared services. The uses to which Federal allocations are presently put, except Amateur Radio, do not lend themselves to flexible response, and the priority of Government use must be maintained.

"The FCC must also implement an accelerated administrative process so that, once appropriate Federal bands have been identified, PMRS licensees can gain access to these bands in an expedited manner. Clear, streamlined procedures must be established that allow the sharing agreements reached between the PMRS users and the NTIA to be implemented."

There is no need to enter into any such arrangement in haste. The speed with which this Petition was considered in itself denies access to the regulatory process to many Amateur Radio operators whose personal resources and ability to generate comments do not equal those of a Land Mobile Coordinating Council, and borders on denial of access to the Rulemaking procedure.

40. Administrative details are not necessarily of interest to those whose spectrum would be occupied, Nevertheless, in the public interest, it is necessary to consider LMCC's recommendations regarding the degree of latitude permitted PMRS on any new spectrum it is permitted to acquire:

"The LMCC also recommends that the FCC avoid adopting unnecessarily rigid rules regarding the types of communications services that can be provided. PMRS licensees should be free to provide a variety of PMRS mobile and fixed services, as long as the proposed services conform to interference criteria and CMRS services are not provided. Such flexibility is in accord with provisions in the recently adopted Balanced Budget Act of 1997, which provides the FCC with authority:

To allocate electromagnetic spectrum so as to provide flexibility of use, if-

(1) such use is consistent with international agreements to which the United States is a party; and

(2) the Commission finds, after notice and an opportunity for public comment, that--

(A) such an allocation would be in the public interest;

(B) such use would not deter investment in communications services and systems, or technology development; and

(C) such use would not result in harmful interference among users.

As long as flexible use does not deter investment in the PMRS band, LMCC believes that flexibility in the licensing of PMRS systems would satisfy the statutory criteria and urges the FCC to address this issue in the Notice of Proposed Rule Making on this matter."

Despite having generated a Petition seeking spectrum to continue its past practices, LMCC at its end of the Petition endorses flexibility. Flexibility should satisfy the statutory criteria and PMRS should be allowed to be flexible, but if PMRS users had earlier been as flexible as Petitioner now suggests they could be, this proceeding would not have arisen. With respect, this writer suggests that the Petition should have been first for additional flexibility in managing present resources, and only second in seeking additional spectrum.

"D. PMRS Spectrum Should be Managed to Minimize the Need for FCC Resources

New PMRS spectrum allocations present opportunities for innovative spectrum management mechanisms that can minimize the need to devote scarce Commission resources for these allocations. One such mechanism is the use of the Commission's frequency advisory committees, which could be charged with assisting the FCC in the management of the PMRS spectrum. Frequency advisory committees have a proven track record in promoting the efficient use of the spectrum. These committees have been extremely effective in the PMRS bands, both below and above 800 MHz, in preventing interference and in promoting efficient use of the spectrum. In fact, according to the FCC's 1994 Annual Report, coordinators are responsible for the successful deployment of almost 19 million PMRS land mobile transmitters.

Frequency advisory committees can also assist the FCC in the fulfillment of its statutory obligation to avoid mutually exclusive applications. Section 309j(6)(E) of the Communications Act charges the FCC with: the obligation in the public interest to continue to use engineering solutions, negotiation, threshold qualifications, service regulations, and other means in order to avoid mutual exclusivity in application and licensing proceedings. Frequency advisory committees can work with applicants to resolve mutually exclusive applications by recommending engineering and technical solutions. Coordinators can also encourage the parties to negotiate voluntary solutions that permit all parties to have access to the spectrum. Given the myriad of PMRS users that need access to spectrum, coordinators can ensure that this vital resource is used efficiently to benefit as many entities as possible."

The above is a succinct description the role and duty of frequency coordinators. However, given the lack of willingness to innovate in the past, this writer suggests that whatever the disposition of this Petition, the Commission continue to exercise oversight of PMRS unless and until its organizations and users demonstrate that they are willing to do what is needed to bring their practices into line with future needs.

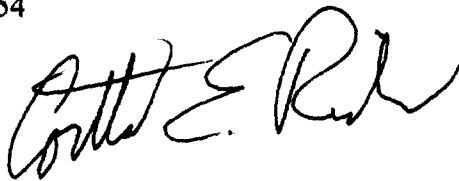
41. Future Communications and the Role of PMRS:

The Commission has taken a leading role in seeking access to communications for all Americans. What LMCC and its members have ignored throughout this proceeding is that when communication is available for all Americans, there will be no need for LMCC or PMRS. This is such a sweeping change in the way communicating is viewed that it seems to have escaped many parties, but it is something LMCC should have considered.

What approach the Commission takes to this matter will affect its work for decades to come. If the Petition is granted, it will adversely impact the ability of the public to avail itself of communications services needed for a more informed and participatory society. Granting this Petition, as written, is therefore not in the public interest, and I urge that the Commission deny it.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Cortland E. Richmond". The signature is stylized with large, flowing letters and a prominent "R".